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Descriptors-*After School Programs, Arithmetic, Behavioral Science Research, *Behavior Problems, *Demonstrations (Educational), Elementary School Students, Home Study, Operant Conditioning, Peer Relationship, Reading, Reinforcement, *Remedial Programs, *Research Projects, Study Habits

Identifiers-CAT Reading Test, Stanford Reading Achievement Test

Research and demonstration activities at the Juniper Gardens Children's Project at the University of Kansas involved studies in these areas: (1) an after school remedial classroom program, (2) inappropriate study behavior in class, and (3) demonstration activities which involved teacher and parent training. The effects of reinforcement contingencies arranged for increasing accuracy and rate of academic performance and for appropriate classroom behavior were analyzed in four experiments in the above areas. Study findings indicated that (1) token reinforcement increased accuracy in pupils who were given after-school remedial work in reading and arithmetic; (2) teacher attention which rewarded good study habits increased the frequency of this behavior in students while punishment decreased good performance; (3) peer control was a possibility in improving the social and academic behavior of students who frequently left their seats in class; (4) auditory reinforcement during reading instruction assisted reading performance; (5) the effect of peer competition in arithmetic problem solving was inconclusive, although some improvement was noted in accuracy; and (6) in a home study program involving mothers who tutored their own children in reading, the reading skill increased when mothers were taught to use reinforcement rather than punitive practices. (MS)

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EDUCATION PROGRESS REPORT

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FINAL PROGRESS REPORT FOR OEO CAP GRANT CG-8180

September 1, 1967 - August 31, 1968

INTRODUCTION

The Juniper Gardens Children's Project OEO Research and Demonstration program began September 1, 1967, and continued through August 31, 1968. Due to extended delays in confirmation of funding, primary support through the early months was carried on University of Kansas funds with a correspondingly greater proportion carried by OEO funds at the end of the project year. The Juniper Gardens Project Staff, students in training at the University of Kansas, teachers, principals and counselors of the public schools and parents from the Juniper Gardens Community participated actively in carrying out the program. The demonstration activities which were an important aspect of the project were designed to make knowledge of the methods being developed available to a wider audience locally, regionally and nationally.

A description of the research and demonstration activities is provided below and includes a description of studies carried out in the After School Remedial Classroom Program, the Inappropriate Study Behavior Program and the Demonstration Activities Program.

AFTER SCHOOL REMEDIAL CLASSROOM PROGRAM

I. Analysis of the Effects of Reinforcement Contingencies Arranged for Increasing Accuracy and Rate of Academic Performance and Appropriate Classroom Behavior

Recent research has demonstrated that reinforcement contingencies can significantly alter student classroom behavior. Studies by Hall, Lund and Jackson (1968) and Thomas, Becker and Armstrong (1968) have demonstrated important relationships between teacher administered social reinforcement contingencies and appropriate classroom behavior. Wolf, Giles and Hall (1968) and Clark, Lachowicz and Wolf (1968) have described the effects of token reinforcement contingencies on the relative rates of workbook performance of low achieving students in an experimental remedial classroom.

The experiments presented here further extend the application of token reinforcement procedures to remediation of academic and behavior defficiencies. Experiments I and II describe analyses of contingencies which were designed to affect accuracy of academic work. Experiment III

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describes the effect of a reinforcement contingency involving competition. Experiment IV presents the effects of token reinforcement and peer reinforcement contingencies on a non-academic, but important classroom behavior (out-of-seat behavior).

EXPERIMENT I

While previous investigations have demonstrated that shifts in token reinforcement leads to shifts in the selection of workbooks in which the students performed, no analysis of the relationship between accuracy of that performance and the reinforcement contingency was carried out. In the present study the effects of discontinuing the relationship between token reinforcement and academic behavior were observed on the accuracy and rate of the workbook performance.

Students: Sixteen elementary school pupils (14 fourth graders and two third graders) from a low income neighborhood participated. Each of the students had scored at least one year below the norm for his grade level either in the reading section or overall on the Stanford Achievement Test administered by the public school in the spring of the previous year. By the end of their first year of participation in the program the students had raised their average public school report card grade from D to C. The report card grades of a control group of 16 similar pupils had remained at the D level.

Program: The program, facilities, staff, token reinforcement system, and materials have been described in detail elsewhere (Wolf, et al., 1968). The students met each afternoon after school for three hours in the basement of a local church. They worked homework and remedial assignments with occasional individual help from a teacher. They received token reinforcement for correct answers when their assignment was completed.

The token reinforcement system resembled a trading stamp plan such as S & H Green Stamps. The students received points which were marked in a booklet by the teachers. When enough points had accumulated they were exchangeable for a number of treats and privileges.

Definition of the Response: The students worked for one hour each day at their ability level in one of three series of workbooks (New Practice Reader of the McGraw-Hill Book Company, Practice for Arithmetic of the Laidlaw Mathematics series, or Individual Corrective English of McCormick-Mathers Publishing Company.). They received five points for each correct reading response, either two points or five points for each correct arithmetic response (depending on whether it was a regular computation problem or a story problem) and two points for each correct English response. On the average the children earned somewhat less than 200 points during the hour. No points were earned for correct responses if an assignment was less than 75% correct.

Procedure: The analysis involved a ABA design. During the first condition (10 sessions) the students received points contingent upon correct workbook responses. Under the second condition (18 sessions) the following announcement was made:

> "You all have been doing so well during workbook hour that you are not going to have to earn your points during this period any more. You will receive 200 free points everyday at the beginning of this period. Remember that you won't receive any points for the work that you do in your workbooks. But we want you to keep working just as hard as you have been."

During the final condition (64 sessions) the points were again made contingent upon accurate responses in the workbooks. The following announcement was made at the beginning of this condition:

> "From now on you will not receive free points during this period. You will have to earn your points by working in your workbooks."

Two other contingencies were added during the third condition. After 18 sessions a bonus of 10 points was earned if an assignment was completed with at least 75% accuracy. And 10 points were lost if the accuracy was less than 65%. After 11 more sessions the contingency was further modified. No points were received if the accuracy of an assignment was less than 75% correct.

Results: Figure 1 shows that under the first condition the proportion of the completed workbook assignments which were at least 75% accurate was approximately 65%. The heavy black line represents the median for the 10 session period.

Under the non-contingent point condition (200 "free points") the proportion of quality work dropped from 65% to about 20%. Interestingly, the total number of assignments which the students turned in increased during this period by about 20% even though the accuracy decreased.

During the third condition when the point contingency was reinstated there was an immediate increase in the proportion of accurate assignments (75% correct and above). However, after 18 sessions the per cent of accurate work had still not gained its former level; so the bonus was added. After 11 more sessions during which time the level of accuracy was greater than during the non-contingent point condition but still below the level of the first condition, the additional contingency was added that only work which was at least 75% accurate would be eligible for points. After approximately 33 sessions the accuracy reached the former level of the first condition. During the final 10 sessions the percent of quality work averaged 72%.

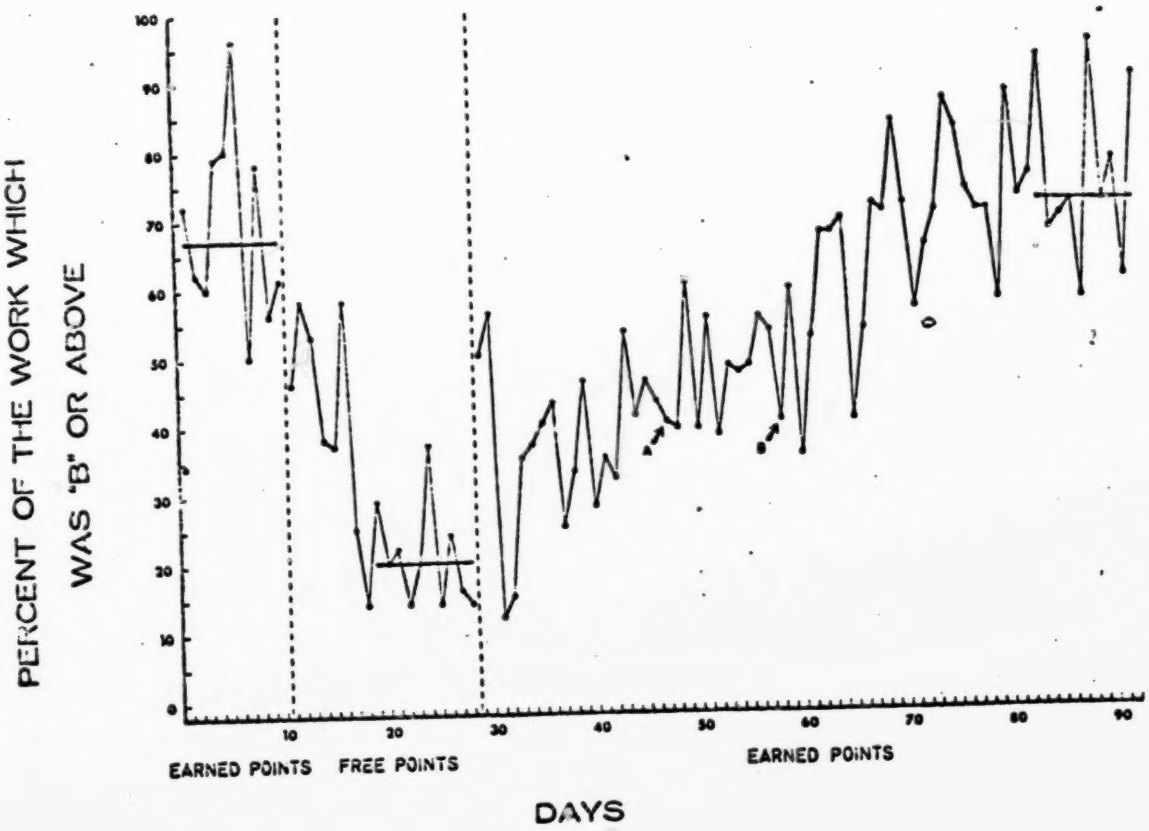

Fig. 1. Percent of completed workbook assignments which were at least 75% correct under conditions of contingent points, free points and a return to contingent points.

Discussion: The high level of accurate work displayed by these students during the first condition might have been attributed to the enriched stimulus environment which the remedial program had created for these low achieveing children from culturally disadvantaged homes. The field trips to the zoo, museum and other events which many of these children had never before experienced, plus the money, clothes, toys and other events and items which the children earned with their points might have been related to the productivity in some way other than as reinforcing consequences. In order to test this possibility the points were changed from consequences to gifts. It is clear from the effects of the substantial reduction in accurate work that it was the events and items acting as consequences rather than as "enriching" stimuli which maintained the accurate responding.

EXPERIMENT II

In this experiment two additional contingencies designed to increase accuracy were evaluated and compared.

Students: Seven of the fifth grade students in the experimental remedial classroom were the subjects.

Program: The program was essentially the same as that in Experiment I. Experiment II was carried out after Experiment I.

Definition of the Response: During a 45 minute period each day the students were allowed to work at their ability level in either a reading workbook (New Practice Reader, McGraw-Hill) or an arithmetic workbook (Practice Workbook of Arithmetic, Treasure Workbooks, Inc.). The experiment consisted of two parts. Part 1 was an investigation of the effects of the students losing reinforcement for inaccurate work after the assignment was completed and scored. Part 2 conpared this post assignment completion contingency with a contingency where the students payed in order to obtain the next assignment. This payment was returned if the completed assignment met the accuracy criteria but was lost if the work was inaccurate (pre-assignment completion contingency).

Part 1

Procedure

Condition A (18 sessions). The students were paid 2 points for each correct arithmetic problem and 5 points for each correct reading problem. Points were paid only if the S's had at least 75% of the assignment correct.

Condition B (10 sessions). The students were paid 5 cents for each page that was 75% correct but for each page that was below the 75% criteria they had to pay 2 cents.

Condition C (19 sessions). The same as condition A above.

Results of Part 1

In condition A the median number of pages per day that were below the 75% criterion was 14. The median number of pages above the 75% criterion was 3 pages. The median number of total pages for the group of 7 subjects was 18.

When subjects were switched to condition B the median number of pages below 75% was 7, and the median number of pages above this criterion was 5. The median number of total pages for the group was 10 pages.

When subjects were returned to condition A the below criterion pages rose to 13 and the above criterion pages rose to 6 pages. Total median number of pages for this condition was 19.

From these data it appears that punishment in the form of it costing money for inaccurate work not only reduces the overall output, but seems to selectively affect the rate of inaccurate work by reducing inaccurately completed assignments while maintaining and perhaps increasing somewhat the rate of accurate work.

Part 2

Procedure

Condition D (12 sessions). The students were paid all of the total possible number of points (2 points for arithmetic and 5 points for reading) for the problems in each assignment provided that they achieved the 75% accuracy criterion. If the 75% correct criterion was not met they had to pay 40% of the total possible points available for that particular assignment.

Condition E (11 sessions). This condition was the same in every respect to D above except that the student had to make the payment in advance (Pre Completion Cost). When the assignment was completed his payment was returned only if he had met the accuracy criterion. If he did meet the criterion he earned his usual points plus the return of this pre-payment.

Condition F (9 sessions). This condition was the same as E above.

Results of Part 2

In condition D the median rate below criterion was 5 pages. The median rate above criterion was 5 pages. The median total rate was 11 pages. In condition E the median rate below criterion was 5 pages and the median rate above criterion was 1 page. The total median rate was 6 pages. In returning to condition F the median rate below criterion was 8 pages, and the median rate above criterion was 3 pages. The total median rate was 10 pages.

Discussion

These results indicate that punishment in the form of lost points for inaccurate work seems to reduce the overall rate in a manner similiar

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to punishment in the form of lost money. Part 2 further indicates that being made to pay for incorrect work prior to doing this work reduces the overall rate even more than when the punishment of point loss comes after the page is corrected. The punishment by points in Part 2 did not seem to act selectively on incorrect units below the 75% criterion, but punishment by points prior to completing a page (condition D) did seem to reduce accurate or above 75% criterion pages.

EXPERIMENT III

The present study was an attempt to determine the effects of various conditions of competition on academic behavior.

Subjects: Subjects in the study were 16 of the low-achieving fifth grade students in the experimental remedial classroom.

Procedure: Each day S's would solve arithmetic problems during two separate fifteen minute periods. At the end of each arithmetic period the problems were checked for each student and they were told how many problems they had correct. Subjects were given various amounts of points for each correct answer depending upon what condition was in effect during that period (i.e., competition or non-competition). Subjects worked on addition and subtraction problems. The addition problems contained four digits horizontally and three digits vertically. The subtraction problems contained two rows of four digits.

Basically two types of competitive conditions were investigated during this study. One condition involved individual competition in which one subject would compete with another subject. (S's were matched for ability.) The second type of setting was that in which two teams of eight S's each would compete as teams. Teams or individuals who won their competitive session would receive a bonus number of points over their competitors' points.

During the course of this study competitive sessions were alternated each day. That is on any day one fifteen minute period would be announced as a competition period and one period would be non-competition.

Results and Conclusion: In evaluating the output of the group during this study it was found that there was little differential responding between competitive and non-competitive sessions, in fact, at times the group responded at a higher rate during non-competitive sessions. What was of significant interest during the course of this study was the steady increase of correct problems worked during each session. During the first few sessions the group median was twelve problems correct in fifteen minutes. By session 80 the group median was about 66 correct problems per fifteen minutes. Individual subjects also showed this same type of increase. For example, two subjects eventually reached a rate of 150 to 160 problems correct in fifteen minutes with an error rate of about 2%. It was also found near the

end of this study that the majority of students would maintain high rates even when there was no pay-off on correct problems. This finding plus the failure to find differential effects of the completion and non-completion conditions may have been the result of the uncontrolled informal competition which seemed to exist among the students.

EXPERIMENT IV

In the experimental remedial classroom we have been interested in studying relationships between our incentive system and the management of disruptive classroom behavior. When we presented the names of our randomly picked experimental group to the school principals and teachers they assured us that we had several students who had major classroom behavior problems. However, much to our disappointment the children in our program have failed to present us with the wealth of interesting disruptive behaviors which we expected. With the exception of a fight on one occasion nothing dramatic has developed.

The only disruptive classroom problem we have had was a high rate of out-of-seat behavior. This is a common classroom problem. Ours involved a certain amount of aimless wandering, extended stays in the bathroom, prolonged pencil sharpening and more visiting than we thought desirable.

The experiment involved two parts. In Part 1 a variable interval schedule of reinforcement for being in seat was introduced. Since the reinforcement contingency for in-seat behavior was not effective for every child an additional peer mediated reinforcement contingency was added.

Part 1

Method

Subjects. The 16 fourth and fifth grade students in the experimental remedial classroom were the subjects.

Procedures. The overall classroom procedures were essentially the same as in the first three experiemnts. During each of the experimental conditions of Experiment IV the students could earn points for completing workbook assignments.

Response Definition. The out-of-seat behavior of the students was recorded by an observer. The hour was divided into 30 second intervals. Suring each 30 second interval the observer would look at each student and count the number who did meet the criterion for being in their seat. The response criterion was that the seat portion of the child's body be in contact with some part of the seat of the child's chair.

The out-of-seat behavior was independently measured by a second observer during two sessions. The number of instances of agreement

about the presence or absence of the response in each 30 second interval for each student was calculated. This yielded agreements of 93% and 94%.

Conditions. There were three conditions. Baseline rate of the out-of-seat behavior was first obtained for each child for 7 sessions. A variable interval schedule of reinforcement for being in seat was then introduced. On the average of every 20 minutes a timer rang. Every student who was in his seat when the timer rang earned five points. This "clock" contingency remained in effect for six sessions. The baseline condition was then reinstated for seven sessions.

Results

As Figure 2 shows the clock contingency was effective in reducing the out-of-seat behavior. The heavy line indicates the median amount of out-of-seat behavior each day under each condition. An average of 17 out-of-seats per hour were recorded during baseline. The clock contingency reduced the average to about two out-of-seats per hour. A return to the baseline condition was accompanied by a return of the frequency of the out-of-seat response to an average of 17 per hour.

Part 2

Method

The subjects, general procedures and response definition were the same as in Part I.

Subjects. Three of the students in Part I were not completely effected by the VI reinforcement contingency. These three were the subjects of Part 2.

Procedures and Response Definitions. These were the same as in Part I.

Conditions. The effects of two means of administering the points were compared. After baseline during which no points were given (20 sessions) the clock contingency was put into effect. For six sessions the points were given to the individual students as in Part I (Individual Points Condition). During the next condition a slightly altered contingency was introduced. Instead of the students receiving 5 points each time they were in their seat when the clock rang they only earned one point, but the four nearest peers also each earned one point. (Peer Points Condition). This condition was in effect for 8 sessions, the Individual Points Condition was reinstated for 9 more sessions and the Peer Points Condition was put back into effect for 17 more sessions.

Results

The out-of-seat behavior of the three students showed some effect of the peer points condition. However, for two of the students the effect was very slight. The data are presented in Figure 3 for the third student. She averaged about 25 out-of-seats per hour during

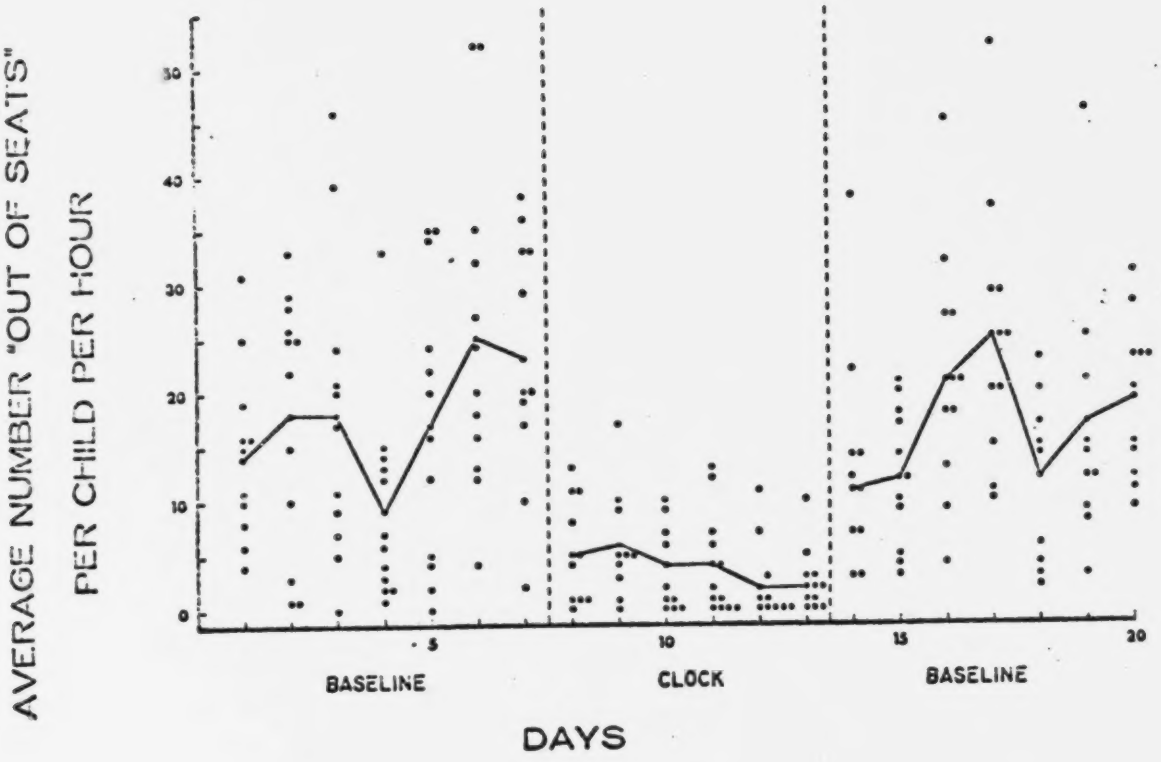


Fig. 2. A record of out of seat behavior under conditions of baseline, points for in seat behavior and return to baseline.

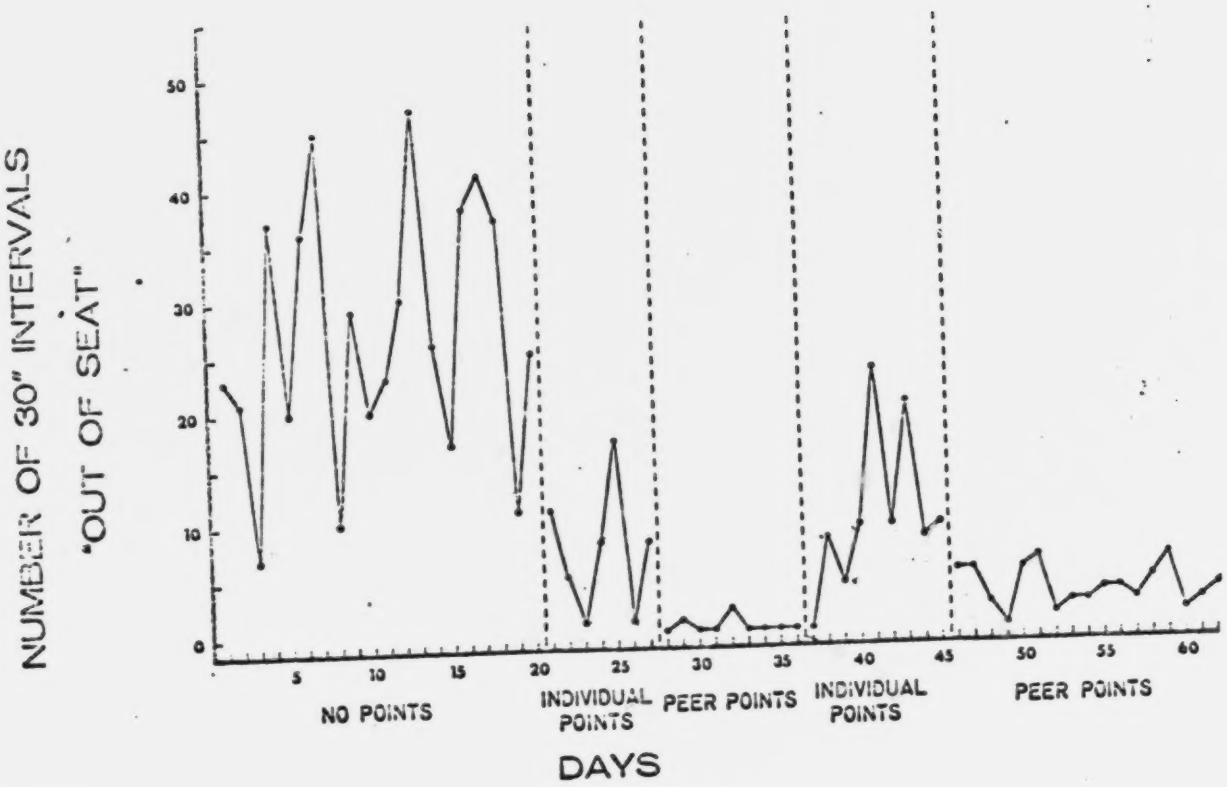


Fig. 3. A record of out of seat behavior for a student under conditions of no points, individual points for in-seat behavior, points to peers for in-seat, individual points and points to peers.

the No Points Condition. When the clock contingency was put into effect the frequency was reduced to an average of about six per hour. During the first Peer Points Condition the behavior dropped to almost zero. When the Individual Points Condition was reinstated the frequency climbed to about six per hour. When the peer contingency was reinstated for the final time, the out-of-seat behavior again declined to a level lower than that of the last Individual Points Condition.

Discussion

The Peer Points Condition was clearly effective for one out of three of the students studied. Instead of that student earning 5 points each time she was in her seat and the clock rang, she only earned one point and shared the rest with her four closest peers. Thus, with the same total number of points the out-of-seat behavior was controlled, apparently, by the praise and nagging the subject received from her peers. These results are tantilizing, suggesting the possibility of using the peers to control important social and academic behavior of the students.

II. Instructional Materials Research

Probably the most serious educational deficit of low income children has been a low level of reading achievement. While many authors have suggested that the child from a low income background suffers from generally retarded language development (Hess and Shipman, 1965) some recent research by Orr and Graham (1968) has suggested that such a child's language disability may be more restricted. Their data indicate that low income children score much closer to middle income children in listening comprehension than in reading comprehension. This implies that the language deficiency of the low income child may be restricted to reading development per se. Accordingly, remedial reading instruction for low income children might be significantly enhanced when the listening repertoire is used to teach new reading vocabulary and comprehension rather than complete reliance on visual context.

For the past two years we have been developing remedial education procedures for poverty-area, low-achieving school children from the elementary grades. Our research has concentrated on motivational procedures involving reinforcement. Treats and privileges have been "earned" through academic performance (Wolf et al., 1968). Recently we have begun refining our academic materials. The primary requirements for a remedial program are that it be adaptable to a wide range of skill levels. Each student must be able to work by himself, at his own rate, on his own deficiencies. Workbooks which can meet these three criteria fail to meet two others which are also essential for self instruction. They do not give immediate feedback (at least not in a manner that precludes cheating by looking ahead). And they do not provide supplemental auditory instruction when (and only when) a student fails to comprehend visually presented reading material. An

automated, audio-visual teaching program which we are refining appears to fulfill all of these requirements.

Thus, the project to be described allowed a test of the hypothesis that a reading program with supplemental auditory assistance would teach low income children more effectively than a reading program which relies entirely on visual material. The proposed project also allowed evaluation of the prototype of a very practical teaching machine and its program.

Procedures: Our automated reading program consisted of an audio and a visual component. The visual material was presented by slide projector and was much like conventional primary reading workbook material, e.g., SRA. The material consisted of several graded series of stories each of which was a few hundred words in length and had several multiple choice, comprehension questions.

During Phase I the student was presented with a story to read and then each of six questions to answer. After reading the story, the student was able to push a button which withdrew the story and presented the six multiple choice questions (made up of words from the story), one at a time. There was no immediate feedback as to correctness of the responses to the questions at that point. When responses had been made to all six questions, the student received "points" on a counter for each of his correct responses. The points were traded in later for pre-arranged back-up reinforcers. The number of points earned per correct response during Phase I increased as the student approached answering all six questions correctly (1,4,8,30,60,120).

On the other hand, if there were any incorrect answers to the six questions, Phase II begins; the story section was re-presented and the visual material was accompanied this time by an auditory presentation of the story as well. All of the words which appeared in the questions appeared in the story section (visually and auditorially).

After the audio-visual presentation of the story section, the six questions were represented visually. Feedback was immediate during Phase II. Each correct answer earned points while an incorrect answer resulted in an immediate return to the audio-visual re-presentation of the story. As soon as the student answered (without error) the series of questions, the program advanced to the next reading section and the Phase I-Phase II cycle began again.

After extensive pilot research in developing the program a small formal research project was carried out.

Method

Subjects: Six experimental and six comparison low achieving, grade-school children from low income families served as subjects.

Analysis: Three analyses were made: 1) the effects of the overall program were evaluated by achievement test performance, 2) the effects of reinforcement on achievement test performance were tested by contingency shifts, 3) the contribution of the sound component was determined.

Results

Achievement Test Performance: Performance differences on achievement test, administered both before and after the training period, were collected for both the low level and the high level groups. As determined by pretesting, the low level group averaged 2.3 years reading retardation, whereas the high level group averaged a deficit of 1.5 years. The CAT Reading Test was the instrument initially used to assess the reading deficits in all students. Upon finding such great retardation in the low group, it was decided that the grade level latitude of the CAT was not appropriate for this group. The SRA Reading Test, which assesses reading achievement between grades 2 to 4, became the testing instrument for the low level group.

Students in the low level group averaged 49 hours of programmed instruction and showed a mean pretest-posttest gain of .3 years on alternate forms of the SRA test. Their controls, who participated in the testing, but not in the program, showed a mean dificit of .03 years, or virtually no change.

Students in the high level group averaged 46 hours of programmed instruction and showed a mean gain of .4 years on alternate forms of the CAT test. Their controls showed a mean gain of .1 years.

With regard to individual performances in each group, two of the three students in both the low level group's test performance was periodically assessed by retesting these students on the original form of the SRA test which these students had been given at the onset of the program. Although these students showed a somewhat progressive improvement pattern, gross changes in this pattern resulted when reinforcement contingencies for test performance were changed. The mean change on retest scores when the contingency was shifted so as to be more lucrative for correct responding was +.7 years for the experimental group and +.1 years for their controls. For the next test the contingency was changed so as to be less lucrative again, and mean test to test differences were collected. The experimental group showed a mean loss of .6 years, while the controls showed a mean loss of .1 years. To affirm the relationship of the experimental group's test performance to the reinforcement contingency, the more lucrative reinforcement contingency was instated again. Upon testing, the experi group showed a mean test gain of .5 years and the control group a gain of .3 years.

Throughout the program, reinforcement shifts for high level students' performance on the progressive improvement measure were carried out. For these students the progressive improvement measure was a machine delivered form of the CAT test in which students viewed slides and then

responded by differential button pressing. Although the pattern of progressive improvement across tests was apparent, shifting the reinforcement contingencies for this group did not effectuate any noticeable change in either the experimental or control subjects' test performance.

Effect of Sound Component: To determine the effect of sound component, administered during the training phase upon subsequent reading performance, all students alternately received stories having sound in their training phases (Phase II), and then stories having no sound during their training phases. This alternating pattern was continued throughout each student's program. Counterbalancing sound-no sound stories across subjects was done so as to reduce the chance effects of differentially "hard" stories upon the group results. The reading performance measure was defined by the ratio of pretraining errors (Phase I) to training errors (Phase II). By using this ratio instead of merely noting the number of errors committed in sound and no sound stories, the effect of the differential difficulty of individual stories across the series was controlled for.

Using this ratio, four of the six students demonstrated a lower error rate in training when they had sound. These students committed 26%, 30%, 35% and 40% more errors, respectively, when they did not have sound during training. One student showed no difference in his error pattern across the sound dimension, and the sixth committed 29% more errors when sound was included in the training. It might be noted, however, that this sixth student's error pattern was grossly influenced by one story at one grade level; that is, 23% of all the training errors made by this student during the entire program were made during the presentation of this single story.

When the collective results for all students were compared as to the sound-no sound error distributions across Phase I and Phase II, the resulting chi-square was significant beyond the .01 level. Thus, if the Phase I error distribution was to be used as a control across the sound-no sound dimension, significantly more errors were committed when sound was withheld from the training.

Another measure of sound's effect upon reading performance was made using as the dependent variable changes in Phase I performance across representations of the same series. Specifically, Phase I performance might be defined as a measure of uninstructed reading where no immediate feedback as to correctness of responding or as to number of points earned was administered. If a grade level series of stories were repeated, a comparison of the changes in the number of Phase I errors in the sound stories as contrasted with number of Phase I errors in the sound that had been administered during the training.

In the initial story series, all the stories were represented, thus allowing the analysis of the error frequency from the first Phase I to the second across the sound dimension.

Five of the six students showed a substantially greater percentage drop in Phase I errors during their second presentation of the training series for those stories where sound had previously been administered. Individual performance may be obtained from the table below.

S	Percentage Drop in Errors From 1st to 2nd Presentation	
	Sound	No Sound
1	35	59
2	71	44
3	72	57
4	37	21
5	43	31
6	67	9

Discussion

The strong evidence in support of the hypothesis that a reading program with supplemental auditory assistance does teach low income children more effectively than a reading program which relies entirely on visual material has an important practical implication. It suggests that a greater educational potential exists for these children when their listening comprehension ability is used than when only visual language is relied upon. The overall results of the audio-visual remedial program suggests that the program is an effective remedial reading instructor and that these procedures are the prototype of a very practical program and teaching machine for taking advantage of low income children's greater potential for auditory assisted instruction. The third finding, that reading achievement test performance was greatly effected by reinforcement for improvement has an important implication. It would appear that not only would these youths benefit from remedial instruction but that their achievement levels would be significantly enhanced by remedial incentives.

Inappropriate Study Behavior Program

Analysis of Effects of Reinforcement Contingencies on Classroom Behavior

A high incidence of inappropriate and/or ineffective study behavior is found in the classrooms and homes of children of an economically disadvantaged area. The failure of these pupils to apply themselves to academic study tasks results in low levels of achievement even though they may be capable of average or even superior performance. Controlling problem behaviors also consumes an inordinate amount of the time and energy of poverty area teachers, principals and counselors, preventing them from devoting more effort to more constructive tasks which would result in an improved school program and curriculm.

Preliminary research by Hall, Lund and Jackson (1968) had indicated that contingent teacher attention could be used effectively to increase study behaviors of elementary pupils who had high rates of distruptive or dawdling behaviors.

The basic procedure used was to have an observer record the behavior of the disruptive pupil during daily observation sessions. Every ten seconds of observation the observer recorded whether or not the pupil was engaged in study. Thus the percent of time the pupil engaged in appropriate study behavior could be computed. Following a baseline period their teachers were signaled by the observer and instructed to provide attention following study behavior and to ignore the non-study behaviors which previously had resulted in reprimands or instructions. These reinforcement procedures resulted in sharply increased study rates and improved academic performance. Follow-up observations and improvement in classroom grades indicated that the higher study rates were maintained after signaling had been discontinued and the formal experimental program was terminated.

During the past year these investigations were expanded to include additional pupils and their teachers. It was also possible to adapt the methods of observation and recording of behaviors so that the procedures could be utilized to include entire classroom groups. As a result, the effects of the procedures were observed on well over 100 pupils.

Experiments: In one study contingent teacher attention was used to rehabilitate a third grade boy whose classroom behavior had been so disruptive he had had to be isolated from his classmates. These behaviors included hitting other pupils, cursing, getting out of his seat to talk to other pupils, tearing up assignments and hiding in the coat closet. Disciplinary actions which had been used, besides assignment to a chair isolated from other pupils included: scolding, being sent to the office, spankings, and being sent home. The observational record indicated that he received most teacher attention for non-study behavior. When the teacher was instructed to ignore non-study and to provide attention contingent on study behavior his

study rate rose from 39% to 70% with an accompanying drop in class disruptions, When this formerly disruptive pupil was moved back to a seat at a table with his classmates, a high study rate was maintained at a level of 70% or above.

An analysis of the effect of varing the amount of teacher attention for two disruptive second grade boys who were classmates was also carried out. The teacher first increased her attention to study behaviors of one of the pair. This resulted in almost tripling his study rate whild his partner's rate rose, although to a lesser degree. The teacher then reinforced the second boy whose rate also rose to a high level while that of the first boy, who was no longer being reinforced, dropped. When study behaviors for both were ignored their rates dropped and returned to higher levels only when praise for study was reinstituted.

The function of the procedure of cueing the teacher in effecting higher study rates was investigated in two studies of pupils who had low appropriate study rates. One involved a boy with a low study rate whose teacher had previously participated in an experiment in which attention was provided for study on cue from the observer. After a baseline study rate had been established for the boy the teacher was asked to increase his attention for study behavior and to ignore non-study behavior. No stimulus cue was provided by the observer. This procedure resulted in the desired increase in study behavior as well as improved classroom marks.

In the second experiment study rates were recorded for a disruptive fourth grade girl. During the first reinforcement period the teacher was instructed to give attention to study behavior and to ignore non-study behavior. No cueing signal was given by the observer. This procedure resulted in a moderate increase in study rate. During the next experimental period an observer signaled the teacher when to provide attention for study. This resulted in a further increase in study. After 10 sessions of signalling by the observer, cueing was discontinued. The high study rate was maintained under this condition until the teacher discontinued giving attention for study. This resulted in a return to low study levels. When teacher attention contingent on study behavior was reinstituted without cueing, the study rate returned immediately to a very high level.

The first study indicated that teachers could successfully increase study rates by applying contingent teacher attention without cueing by an observer. The second study indicated, however, that even higher study rates could be achieved with cueing than without but that once established, high levels could be maintained without the necessity of an observer's signal.

A series of experiments by Broden and Hall (1968) demonstrated that contingent teacher attention could be used effectively to increase appropriate classroom behavior for some pupils at the junior highschool level. Previous studies had indicated that teacher attention was an effective reinforcer for younger children but there was some question

as to whether it would effect behavior of older pupils.

In one study teacher attention was made contingent on appropriate handraising in a girl who would often raise her hand and speak out of class without permission. Under conditions in which the teacher systematically recognized the girl only when she was quiet and her hand raised, appropriate handraising, appropriate verbalizations and appropriate behavior while reinstatement of reinforcement contingencies resulted in a return of appropriate handraising, verbalization and study. Post checks indicated the appropriate behaviors were maintained up to five months after the formal experimental conditions were terminated.

Less dramatic results were obtained with an eighth grade boy whose teacher failed to carry out with enthusiasm the suggested procedures of reinforcement for study behavior. Essentially the problem seemed to be that the teacher was not satisfied with reinforcing successive approximations to the disired terminal behavior and, therefore, provided praise and attention at minimally increased rates. Even so, there were the expected increases in class participation by the boy although the overall changes in his behavior were not as significant as those seen in most previous studies.

Another investigation of the application of reinforcement principles to increase study behaviors at the junior highschool level involved a special education classroom (Broden and Hall, 1968). The fourteen seventh and eighth grade pupils in this class exhibited various problem behaviors which made it difficult for teachers to teach them in a regular classroom. All were several years behind in at least one major academic area. Problem behaviors included emotional outburst, acts of delinquency, incoherent speech, fighting, cursing teachers, refusing to obey teacher requests, refusing to do assigned work, throwing classroom materials and chasing around the room. These behaviors were prevelant at the time of the study despite the generally accepted teaching methods used which included individualized instruction, some praise for good behavior, reprimands or a trip to the principal or counselor for misbehavior, and parent contacts.

An initial experiment was carried out during the fifth of eight daily class periods. The fifth period baseline study rate was 29%. The study rate was almost doubled (57%) when the teacher concentrated her attention on study behavior and ignored all non-study behaviors. This was further increased to approximately 75% by allowing pupils to go to lunch early if they were quiet and studying when a timer was set to go off at random times throughout the period. Reversal procedures demonstrated that praise and early dismissal were functional in maintaining the higher study rates.

A second experiment was carried out with this group when it was found the increased study rates during fifth period did not generalize to the other seven daily class periods and did not materially affect

study rates of all class members.The classroom study rate was increased dramatically when a point system was introduced. Points could be earned by engaging in a variety of appropriate behaviors. The points could be turned in for various privileges and preferred activities from a list compiled by the teacher and pupils themselves, including library privileges, field trips, early lunch dismissal, talking to classmates, getting a drink, etc. Minus points could be earned off by detention time or extra credit work. Removing the point system caused the study rate to drop to baseline levels within three periods and brought a return to disruptive behavior. An analysis of the individual study rates of all fourteen pupils revealed the varying responsiveness of pupils to the various conditions of the study.

The individual pupil behavior analysis technique was modified in the cases of three teachers who had been referred by their principals because of general classroom control problems. It became apparent as soon as observation had begun in these classrooms that many pupils were included in the observations and experimental procedures.

This was made possible by the development of a reliable means of recording classroom study behavior. Essentially this consisted of recording the behavior of one child in the classroom for five or ten seconds, recording the behavior of the next, then the next, until a number of samples of every pupil's behavior on a consecutive rotation basis had been obtained. From these data the mean study rate of an entire class could be computed.

One study involved a sixth grade class taught by a first year teacher. Pupil behavior was according to the principal, "entirely out of control." Study rates were recorded for the entire classroom. A record was also kept of the number of times the teacher made approving comments following appropriate study behaviors by members of the class.

Even though the principal had counseled the teacher and a helping teacher had demonstrated good teaching techniques during the baseline period, effects of these procedures were negligible and transitory and study behavior remained at low levels.

Following baseline the teacher was instructed to increase the amount of praise given for appropriate study. This resulted in a marked increase in study behavior. Only during a brief reversal when the teacher discontinued prasie for study did it fall to low levels. Both the teacher and the principal concurred in their opinion that as a result of his ability to carry out the procedures, the teacher had gained control of his classroom.

Another group experiment involved study behavior of a first grade class during reading period. A first year teacher had been unable to achieve good study rates on the part of class members doing seat work while she worked with one or another of the three reading

groups at the front of the room. After the baseline study rate was determined the teacher increased the amount of praise for sutdy by the class. This slightly increased the class study rate. A much higher study rate was achieved during a second experimental period in which a game followed the study period as a reward for good study beahvior. Brief reversals resulted in lower study rates with prompt returns to high study levels as soon as study behavior was again rewarded by allowing the pupils to play the game in which "best studiers" were chosen to be "it" for the first round.

A third experiment involved a class of thirty junior high school students enrolled in a seventh grade unified studies (English and Social Science) class. During baseline high rates of talking without permission, out of seat behavior, fighting, throwing paper, and other disruptive behaviors were observed. The noise level was so high the teacher kept his door closed at all times with the shade drawn over the door's window. The teacher verbally reprimanded pupils for engaging in non-study behaviors almost once every minute. During the first experimental period the teacher decreased his attention to non-study behavior and increased his attention to appropriate study. This procedure resulted in increasing study from 47% to 65%. Study behavior rose to 76% during a second experimental period in which disruptive behaviors were punished by subtracting 10 seconds from the five minute between period break for each disruptive behavior by a class member. Under reinforcement conditions the class noise level was greatly reduced and the teacher was able to leave the hallway door open and even left the room for short periods without major disruptions occurring.

One series of studies was carried out by teachers, principals, and counselors who attended a class on behavior management. Their work showed that the necessary behavioral records and the systematic procedures needed to bring about behavioral change could be carried out by school personnel. The behaviors successfully modified and the reinforcers used illustrated that there is a wide range of behavior problems which can be solved through reinforcement techniques and there are a number of reinforcing consequences available in the schools. In one experiment a second grade teacher used praise, the privilege of of being first in the dismissal line and a special treat as reinforcers for reducing the number of times pupils spoke out in class without permission.

A first grade teacher was able to reduce the number of times a pupil came up to her desk without permission. Ignoring the child when he came to teacher's desk and social reinforcement for waiting in his seat with raised hand brought about the disired change. A special education teacher almost eliminated chair tilting in a boy who had previously tilted his chair almost constantly by using the privilege of being a classroom monitor as a reinforcer. A counselor helped a teacher extinguish disruptive behaviors in a first grade girl and concurrently helped the teacher to use social reinforcement to increase the girl's appropriate behaviors after extensive counseling had been proved ineffective.

A second counselor got the school secretary, principal and teacher to assist her in praising a boy and his parent for coming to school regularly. This procedure interrupted a long-standing pattern of frequent absences and resulted in perfect attendance throughout the reinforcement period. One principal reduced the number of cases of tardiness in his building by going around to the classrooms and praising those pupils who had gotten to class on time. Another school principal reduced the noise level in the school hallway following the afternoon dismissal bell. He went around to the rooms, praised the pupils for being quiet in the hall and provided a special recess as reinforcement for quietly leaving the building. As a result of these procedures, the pupils were soon practically tiptoeing out of the building.

His observation was verified by a voice operated tape recorder which was used to measure the noise level in the hallway during both baseline and experimental phrases of the experiment.

Discussion

The results of these experiments served as a further demonstration that contingent reinforcement could be used by teachers, principals and counselors to bring about increased rates of appropriate behavior on the part of pupils from poverty areas.

Not only were the procedures shown to be effective with individual pupils but also with entire classroom groups where teachers were having significant problems in maintaining classroom control. It was further demonstrated that teachers, counselors and principals could learn to record behavior and apply the principles to bring about changes in long-standing behavioral problems which are common in schools with large numbers of pupils from a depriving environment.

THE HOME STUDY PROGRAM

Preliminary investigations at Juniper Gardens have revealed that the pattern of social reinforcement between parent and child in a poverty area community is often punitive or deficient. (Risley, 1968; Bushell and Jacobson, 1968). Thus, even through parents want their children to succeed in school, their attempts to aid them in their studies are often ineffective or even detrimental.

Preliminary research also indicated, however, that the high motivation level of parents could be channeled into constructive teaching techniques. When they were taught to use effective social reinforcement procedures, their children made rapid gains in acquiring pre-academic skills.

Many pupils at Juniper Gardens are referred by both teachers and parents because of reading retardation. During the past year a program was implemented in which parents acted as reading tutors for their own children.

Twelve children in the elementary grades of Juniper Gardens area schools who were referred by parents or teachers participated in the program during the past year. Their school standardized achievement tests and classroom grades were used as pre- and post-test measures of reading progress. In addition, tape recordings were used to measure oral reading rates, error rates and verbal contingencies supplied by the parent.

After an oral reading test (Gilmore Oral Reading Test) had been administered to help determine the reading level, the mothers were provided with an appropriate level reader of the Scott, Foresman New Basic Readers Series. She was instructed to listen to and help her child read in daily sessions lasting approximately ten minutes.

A small portable tape recorder was provided so each session could be taped. During several initial sessions an experimenter was present to observe and show the parent how to run the tape recorder. Gradually the experimenter withdrew except for weekly or bi-weekly visits.

The tape recordings were used to analyze the child's reading and error rates and the rates at which the parent provided, prompts (i.e., told the child words which he did not know) praise, reprimands, criticism or other verbal consequences.

An analysis of the baseline session tapes revealed that all mothers had very low praise and prompt rates. Most had either high rates of providing verbal reprimands or criticism or provided almost no verbal consequences.

After several baseline sessions, the mothers were told to provide prompts whenever a child had difficulty with a word and to increase the rate of praise given for successful reading performance. At the same time they were asked to decrease their rates of providing verbal criticism and reprimands for inadequate performance.

This resulted in a relatively rapid increase in reading rate and a reduction in reading errors. Once the higher reading rates had been established it was generally found that going back to the previous conditions of low praise and prompt rates by the mothers did not result in poorer performance. In other words, once better reading was established it was not reversible. In one case, even when the mother was withdrawn from the situation and the child read only to the tape recorder there was no drop in reading proficiency, in fact there was a further increase in reading rate and drop in reading errors.

A typical record of a child's reading and error rates and a corresponding record of the verbal consequences provided by the mother are presented in Figs. 4 and 5.

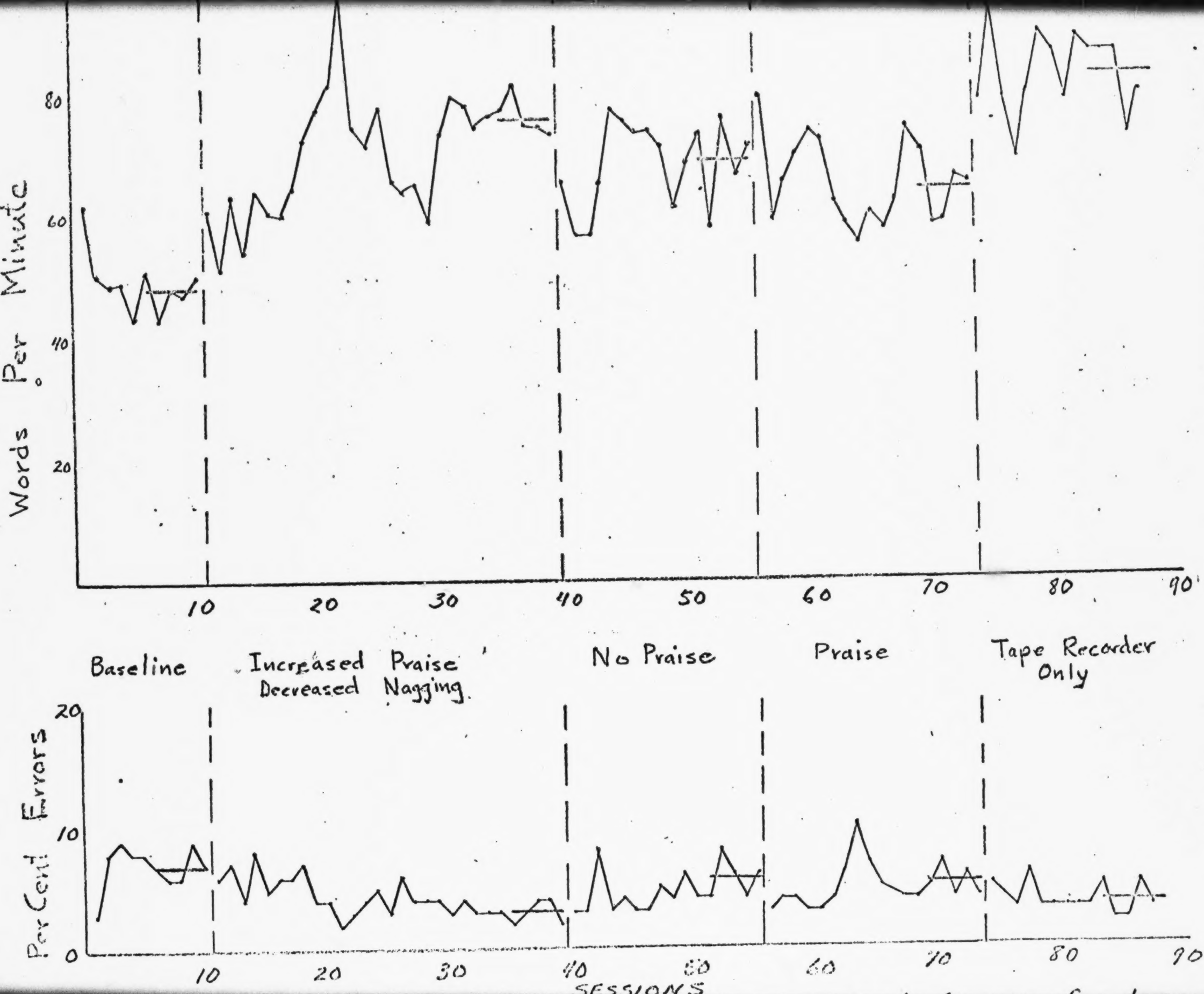
Due to the fact that pupils were at different grade levels, they entered the program at various times during the year and that a number have still not completed it, research results are as yet incomplete. Initial findings have indicated, however, that results will be promising.

Five pupils (average I.Q. 90) were matched to five control pupils (average I.Q. 89) who had similar reading achievement histories presented the following comparisons:

Three of the Experimental group and only one of the Control group showed a gain of at least one level (i.e., from low to average or average to high on their Ginn Reading Achievement Test Scores.) One of the Experimental group and three of the Control group showed no gain. One in each group showed a loss. Three of the Experimental group showed an improved report card grade in reading, two maintained their initial report card grade, none received a lower grade. None of the Control group improved in report card grades, four maintained the same grade level and one received a lower grade.

According to teacher reports, two pupils who participated in the program became "the best readers in the class" by the end of the school year, even though they had previously had significant reading problems.

Further analysis of the data and of the parental tutoring behaviors will be necessary to ascertain which aspects of the program account for the reading improvement. Therefore, this program will be continued and extended during the coming year.


Words Per Minute
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Baseline
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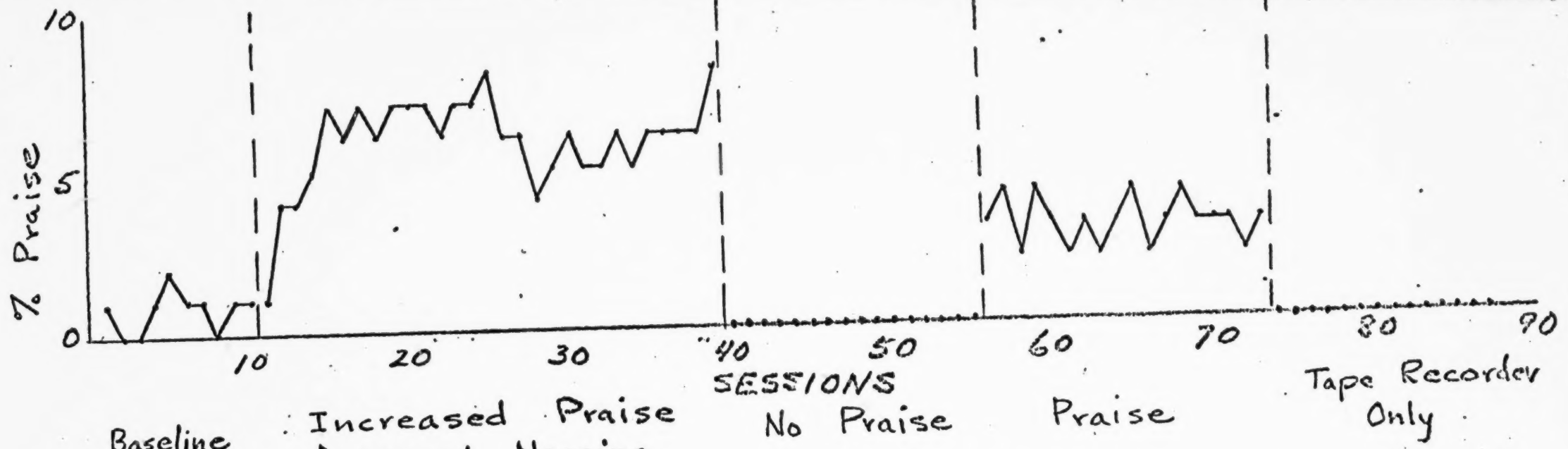
SESSIONS



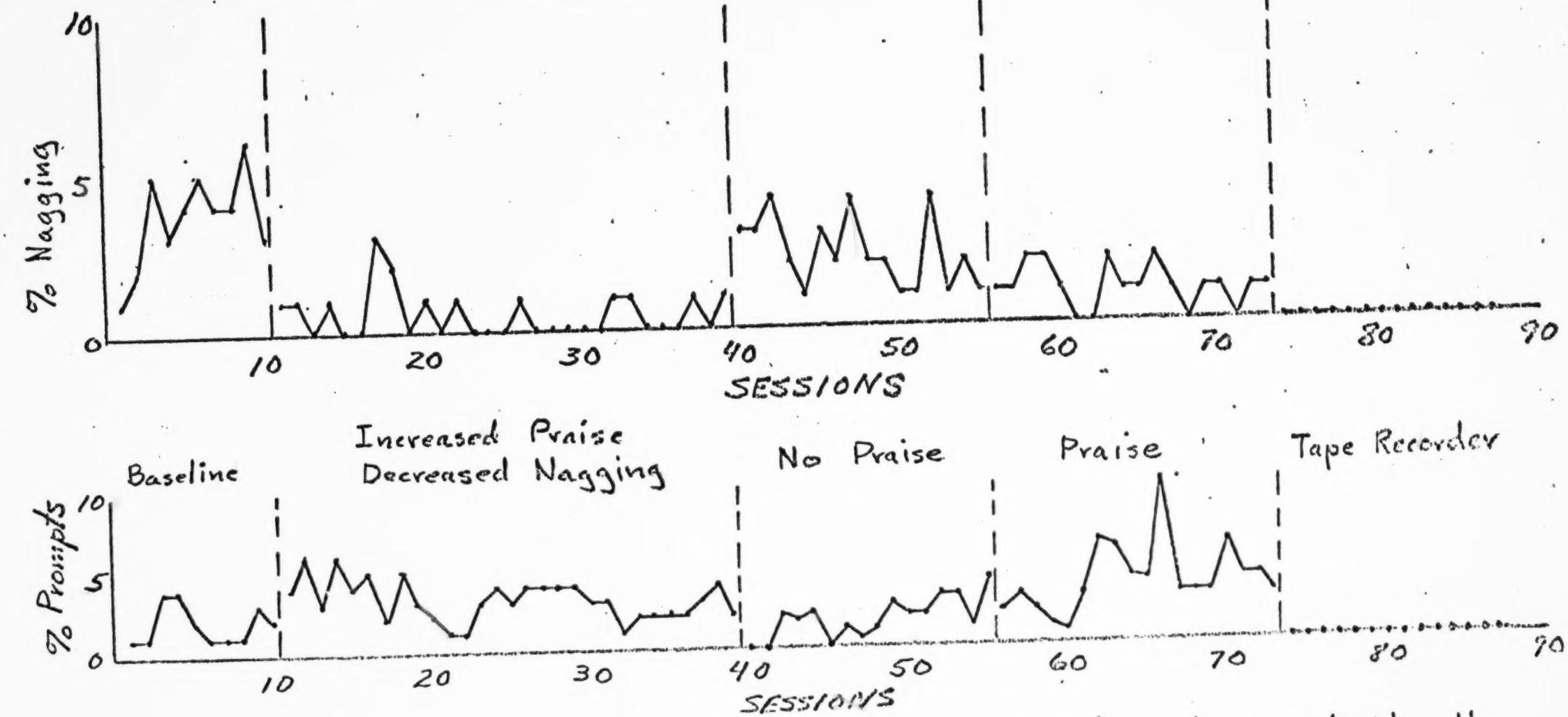


Fig. 5 A record of praise, nagging (criticism, reprimands, etc.) and prompts by the mother of Lenny during 10 min. reading sessions.

DEMONSTRATION ACTIVITIES

Demonstration activities were a prominent feature of the project activities during the year. A total of 13 university students received training while participating actively in the program as teachers, research assistants, or observers. In addition to this over 233 students visited the project. This group included both graduate and undergraduate students from the following schools and universities:

Bank Street College
Western Michigan University
St. Luke's Hospital, Kansas City, Missouri
Park College
Kansas University
University of Arizona
University of Missouri at Kansas City
Hastings College, Hastings Nebraska
Kansas University Medical Center
Wyandotte County Mental Health and Guidance Clinic
University of North Carolina
Stanford University
Children's Mercy Hospital, Kansas City, Missouri

A large number of professional persons also visited the project. This group included a number of prominent educators, social scientists and psychologists from widely scattered universities both within and outside the continental United States as well as various government officials. Among these were the following:

Dr. Kenneth Reeb, University of Wisconsin
Dr. Charles Branthawer, University of Minnesota
Mr. Ted Blizzard, Aide to Governer Romney of Michigan
Mr. Gary Jordon, Children's Mercy Hospital
Dr. Larry Bradford, Children's Mercy Hospital
Dr. Beatrice Wright, University of Kansas
Mrs. Joyce North, Education Modulation Center
Mr. James Ferguson, Racine Wisconsin Unified Schools
Mr. Alfred Held, Racine Wisconsin Unified Schools
Dr. Milton Hillery, Racine Wisconsin Unified Schools
Dr. David L. Sweeney, Racine Wisconsin Unified Schools
Dr. Arthur Staats, University of Hawaii
Dr. Joseph Weaver, Children's Rehabilitation Unit
Dr. Peter Mittler, University of London
Dr. J. Parker, Florida State University
Miss Betty Daly, Faribault State Hospital, Fairbault Minnesota
Dr. Pat Nienow, Faribault State Hospital, Fairbault, Minnesota
Mr. Fred Schulman, Brooklyn, New York
Mr. Louis Brown, Florida State University
Dr. Brian O'Hara, University of Washington
Dr. James McLean, Parsons State Hospital

Dr. Alfredo V. Lagmay, University of the Philippines
Dr. Ozer, University of Arizona
Dr. Segall, University of Arizona
Dr. Shafer, University of Arizona
Mr. Dennis E. Popp, State Department of Social Welfare
Mrs. Livingston, Institute for Pupil Study
Mrs. Alice Kampsen, Education Modulation Center
Mr. Bill D. Oetting, Olathe School District
Dr. Roger Ulrich, Western Michigan University
Mrs. Martin, St. Luke's Hospital
Dr. Wesley Becker, University of Illinois
Dr. Ralph Wetzel, University of Arizona
Dr. John L. Johnson, Syracuse University
Dr. Karl Edwards, Kansas University
Dr. Robert L. Schalock, Hastings College
Mrs. Joan Baller, Community Children's Center
Mrs. Jeweldean Jones, National Urban League
Dr. Robert W. Ridgway, Kansas University
Dr. Leah McReynolds, Kansas University Medical Center
Dr. Stanley Murrell, Wyandotte County Mental Health and Guidance Center
Dr. Leo Munoz, Northern Arizona University
Dr. James Biglin, Northern Arizona University

As described in the main body of this proposal, the training of parents within the community to use more effective teaching procedures is a main focus of the project. Other community members and lay groups have also been introduced to the project through the demonstration activities headed by Mr. Owens, the Demonstration Coordinator.

Both a series of slides and a motion picture sound film were developed during the past year to assist in carrying out the demonstration functions of the project. The film was used as an introduction to the project and was well received by a widely ranging audience of both professional and non-professional persons. The slides, which included graphic research data, were used primarily in research presentations to professional audiences.

The sound film Spearhead at Juniper Gardens was shown by staff personnel to audiences totaling well over 1000 persons during the year. In addition copies of the film were sent to the Regional and National Offices of the Office of Economic Opportunity and to the University of Kansas Bureau of Visual Instruction. The latter office reported an almost constant demand for the Juniper Gardens film and it can only be assumed that additional hundreds of persons viewed it through these outlets.

The series of colored slides including graphic research data were a part of the numerous presentations made in college classes and at professional meetings and workshops. These professional groups included:

Council for Exceptional Children International Convention, New York, New York.

American Psychological Association Convention, San Francisco, California.

President's Council on Mental Retardation, Washington, D. C.

American Association of Mental Deficiency, Boston, Massachusetts.

National Association of Early Childhood Education, San Francisco, California.

Southwest Regional Educational Laboratory, Los Angeles, California.

Workshop in Behavior Modification, University of Oregon, Eugene, Oregon.

Professional presentations and consultations were also made at the locations below. In each case a token reinforcement program for low-achieving poverty area children patterned after the programs developed at Juniper Gardens has been instituted. The director of the program and the sponsoring institution is also given:

New York Public Schools
Paul Graubard, Department of Special Education
Yeshiva University
New York, New York

Pittsburgh Public Schools
Dr. Loren Resnick
Center for Educational Research and Development
Pittsburgh, Pennsylvania

St. Louis Public Schools
Dr. Robert Hamlin Department of Sociology
Washington University
St. Louis, Missouri

Vermont Public Schools
Dr. Hugh McKenzie, Consulting Teacher Program
College of Education
University of Vermont
Burlington, Varmont

Racine Wisconsin Public Schools
Dr. Welton Hillary Director of Research

Racine Public Schools
Racine, Wisconsin

Mr. Robert Hoyt, Editorial Supervisor and Mr. Robert Gardner who produced the Spearhead at Juniper GArdens film are currently preparing a follow-up training film which will update and show in detail procedures used in the Juniper Gardens Project Research and Demonstration Program.

CONSULTANT SERVICES

Continuous modification and eveluation of the project program was made possible partly through the active participation of various professional consultants. Among these were Dr. Donald M. Baer, Chairman of Child Development, Department of Human Development and Family Life of the University of Kansas, Dr. Joseph Spradlin, Associate Director of Research of the Bureau of Child Research and Dr. James Sherman, Department of Human Development and Family Life.

Several consultants from outside the Bureau of Child Research and the University of Kansas also participated actively in the project. Among those who visited, viewed our demonstration materials and made recommendations regarding the ongoing research program and the development of further audio-visual training films were, Dr. Harold Weiner, Director, Operant Conditioning Laboratories, National Institute of Mental Health, Washington, D. C., Mrs. Florence Harris, Director, Developmental Psychology Laboratories, University of Washington, Dr. Jay Birnbaruer, University of NOrth Carolina, Dr. Arthur Staats, University of Hawaii, and Dr. William Hopkins, Kalamazoo State Hospital.

Laison with the community was the primary responsibility of Mr. Owens. Mr. Owens met with various community groups and attended monthly meetings of the Executive Committee of the Neighborhood Action Group which acted as a community advisory committee to the project. Community contact with the project was intensified since there was almost daily contact with the parents, teachers, principals and counselors of the children who participated actively in the program.

In addition to the continuing contact with the Juniper Gardens area school staffs, laison was maintained with the schools and the University through a professional advisory board composed of representatives from the University of Kansas Department of Education and representatives of the Kansas City, Kansas Public Schools.

Throughout the project year laison with the Regional Office was maintained through Mr. William R. Feezle, Educational Specialist, Miss Linda Carson, Headstart Consultant, and Mr. James Hearn, District CAP Supervisor. Mr. Feezle's interest and active participation in program planning was especially helpful in project development.